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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,250	03/30/2004	Michael A. Schultz	108524	4825

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JOHN G TOLOMEI, PATENT DEPARTMENT
UOP LLC
25 EAST ALGONQUIN ROAD
P O BOX 5017
DES PLAINES, IL 60017-5017

EXAMINER
DOUGLAS, JOHN CHRISTOPHER

ART UNIT	PAPER NUMBER
1764	

DATE MAILED: 07/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/813,250	SCHULTZ ET AL.	
	Examiner	Art Unit	
	John C. Douglas	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3/30/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-8, 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsybulevskiy (US 2002/0009404) in view of Bal (US 6482316).

5. With respect to claims 1, 3, and 4, Tsybulevskiy discloses where a hydrocarbon stream containing sulfoxides is contacted with a zeolite adsorbent to produce a hydrocarbon stream having a reduced concentration of sulfoxides (see Tsybulevskiy, paragraphs 2 and 26). Tsybulevskiy does not disclose where the adsorbent is contacted with a desorbent to produce a desorbent containing the sulfur compounds and an adsorbent having a reduced content of the sulfur compounds, does not disclose where the adsorbent with reduced sulfur is contacted with a hydrocarbon stream containing sulfur, and does not disclose fractionating the desorbent containing sulfur compounds to obtain a desorbent with reduced sulfur.

However, Bal discloses desorbing sulfur compounds from an adsorbent and treating the desorbent to remove sulfur from the desorbent (see Bal, column 1, line 65 – column 2, line 8 and claim 1).

Bal discloses that the desorbent is used to regenerate the adsorbent (see Bal, column 1, lines 60-65).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Tsybulevskiy to include desorbing sulfur compounds from an adsorbent and treating the desorbent to remove sulfur from the desorbent in order to regenerate the adsorbent.

Also, it would have been obvious to contact the regenerated adsorbent with a hydrocarbon stream so that the adsorbent can remove sulfur from the hydrocarbon stream.

6. With respect to claims 2 and 11, Tsybulveskiy discloses desulfurizing a diesel duel with an adsorbent (see Tsybulveskiy, paragraph 16).

7. With respect to claim 5, Tsybulevskiy discloses an absorbent that has an adsorption capacity of 0.62 wt% for a sulfoxide (see Tsybulevskiy, example 11, Table 4).

8. With respect to claim 6, Tsybulevskiy discloses where the adsorption contacting step is conducted at temperatures in the range of 10to 40 degrees C and pressures in the range of 300 to 6000 kPa (3 to 60 bars) (see Tsybulevskiy, paragraph 48).

9. With respect to claim 7, Bal discloses where the desorbent is introduced at temperatures between about 27 degrees C to about 400 degree C (see Bal, column 3, lines 21-25).

10. With respect to claim 8, Bal discloses where the desorbent is toluene (see Bal, column 3, lines 46-51).

11. With respect to claim 10, Bal discloses recycling the desorbent to the desorbing step (see Bal, column 1, lines 43-53).

12. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsybulevskiy in view of Bal as applied to claim 1 above, and further in view of Ognisty (US 5755933). Tsybulevskiy in view of Bal disclose everything in claim 1, but do not disclose where the fractionating step is conducted in a split shell fractionation step.

However, Ognisty discloses a fractionation zone with a vertical partition (see Ognisty, column 2, lines 50-54).

Ognisty discloses that such a distillation column with a vertical partition allows for pre-stripping of the feed, which provides for space and equipment savings (see Ognisty, column 1, lines 41-45).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Tsybulevskiy in view of Bal to include a fractionation zone with a vertical partition in order to allows for pre-stripping of the feed, which provides for space and equipment savings.

13. Claims 12-19 and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsybulevskiy in view of Bal and Wessels (US 4354929).

14. With respect to claims 12, 14, 15, 23, and 24, Tsybulevskiy discloses where a hydrocarbon stream containing sulfoxides is contacted with a zeolite adsorbent to produce a hydrocarbon stream having a reduced concentration of sulfoxides (see Tsybulevskiy, paragraphs 2 and 26). Tsybulevskiy does not disclose where the adsorbent is contacted with a desorbent to produce a desorbent containing the sulfur compounds and an adsorbent having a reduced content of the sulfur compounds, does not disclose where the adsorbent with reduced sulfur is contacted with a hydrocarbon stream containing sulfur, and does not disclose fractionating the desorbent containing sulfur compounds to obtain a desorbent with reduced sulfur.

However, Bal discloses desorbing sulfur compounds from an adsorbent and treating the desorbent to remove sulfur from the desorbent (see Bal, column 1, line 65 – column 2, line 8 and claim 1).

Bal discloses that the desorbent is used to regenerate the adsorbent (see Bal, column 1, lines 60-65).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Tsybulevskiy to include desorbing sulfur compounds from an adsorbent and treating the desorbent to remove sulfur from the desorbent in order to regenerate the adsorbent.

Also, it would have been obvious to contact the regenerated adsorbent with a hydrocarbon stream so that the adsorbent can remove sulfur from the hydrocarbon stream.

In addition, Wessels discloses the use of n-hexane as a purge to sweep out hydrocarbons from the adsorbent (see Wessels, column 1, lines 21-27).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Tsybulevskiy to include the use of n-hexane as a purge in order to sweep out hydrocarbons from the adsorbent.

15. With respect to claims 13 and 22, Tsybulveskiy discloses desulfurizing a diesel duel with an adsorbent (see Tsybulveskiy, paragraph 16).

16. With respect to claim 16, Tsybulevskiy discloses an absorbent that has an adsorption capacity of 0.62 wt% for a sulfoxide (see Tsybulevskiy, example 11, Table 4).

17. With respect to claim 17, Tsybulevskiy discloses where the adsorption contacting step is conducted at temperatures in the range of 10to 40 degrees C and pressures in the range of 300 to 6000 kPa (3 to 60 bars) (see Tsybulevskiy, paragraph 48).

18. With respect to claim 18, Bal discloses where the desorbent is introduced at temperatures between about 27 degrees C to about 400 degree C (see Bal, column 3, lines 21-25).

19. With respect to claim 19, Bal discloses where the desorbent is toluene (see Bal, column 3, lines 46-51).

20. With respect to claim 21, Bal discloses recycling the desorbent to the desorbing step (see Bal, column 1, lines 43-53).

21. Claims 20, 25, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsybulevskiy in view of Bal and Wessels as applied to claim 12 above, and further in view of Ognisty (US 5755933).

22. With respect to claim 20, Tsybulevskiy in view of Bal disclose everything in claim 1, but do not disclose where the fractionating step is conducted in a split shell fractionation step.

However, Ognisty discloses a fractionation zone with a vertical partition (see Ognisty, column 2, lines 50-54).

Ognisty discloses that such a distillation column with a vertical partition allows for pre-stripping of the feed, which provides for space and equipment savings (see Ognisty, column 1, lines 41-45).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Tsybulevskiy in view of Bal and Wessels to include a fractionation zone with a vertical partition in order to allows for pre-stripping of the feed, which provides for space and equipment savings.

23. With respect to claims 25 and 26, Wessels discloses where the n-hexane purge is fractionated to produce an n-hexane overhead fraction that is recycled for use as purge gas (see Wessels, column 2, lines 10-23).

24. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsybulevskiy in view of Bal and Wessels. Tsybulevskiy discloses where a hydrocarbon stream containing sulfoxides is contacted with a zeolite adsorbent to produce a hydrocarbon stream having a reduced concentration of sulfoxides (see Tsybulevskiy, paragraphs 2 and 26). Tsybulevskiy does not disclose where the adsorbent is contacted with a desorbent to produce a desorbent containing the sulfur compounds and an adsorbent having a reduced content of the sulfur compounds, does not disclose where the adsorbent with reduced sulfur is contacted with a hydrocarbon stream containing sulfur, and does not disclose fractionating the desorbent containing sulfur compounds to obtain a desorbent with reduced sulfur.

However, Bal discloses desorbing sulfur compounds from an adsorbent and treating the desorbent to remove sulfur from the desorbent (see Bal, column 1, line 65 – column 2, line 8 and claim 1).

Bal discloses that the desorbent is used to regenerate the adsorbent (see Bal, column 1, lines 60-65).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Tsybulevskiy to include desorbing sulfur compounds from an adsorbent and treating the desorbent to remove sulfur from the desorbent in order to regenerate the adsorbent.

Also, it would have been obvious to contact the regenerated adsorbent with a hydrocarbon stream so that the adsorbent can remove sulfur from the hydrocarbon stream.

In addition, Wessels discloses the use of n-hexane as a purge to sweep out hydrocarbons from the adsorbent (see Wessels, column 1, lines 21-27). Wessels also discloses where the n-hexane purge is fractionated to produce an n-hexane overhead fraction that is recycled for use as purge gas (see Wessels, column 2, lines 10-23).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Tsybulevskiy to include the use of n-hexane as a purge in order to sweep out hydrocarbons from the adsorbent.

Conclusion

25. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Satokawa (US 6875410).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John C. Douglas whose telephone number is 571-272-1087. The examiner can normally be reached on 7:30 A.M. to 4:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JCD

Glenn Caldarola
Supervisory Patent Examiner
Technology Center 1700